

CHAPTER 9

CORRECTIVE ACTION TO CLEAN UP HAZARDOUS WASTE CONTAMINATION

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OVERVIEW

Past and present activities at RCRA facilities have sometimes resulted in releases of hazardous waste and hazardous constituents into soil, ground water, surface water, and air. The Statute generally mandates that EPA require the investigation and cleanup, or remediation, of these hazardous releases at RCRA facilities. This program is known as **corrective action**. In 1996, EPA estimated that approximately 5,000 RCRA facilities are potentially subject to RCRA corrective action, over three times the number of sites on the

Superfund National Priorities List (NPL) (as discussed in Section VI, Chapter 2). The degree of investigation and subsequent corrective action necessary to protect human health and the environment varies significantly among these facilities.

EPA enforces the corrective action program primarily through the statutory authorities established by HSWA. Prior to HSWA, EPA's statutory authority to require cleanup of hazardous releases was limited to situations where the contamination presented an "imminent and substantial endangerment to health or the environment." Regulatory authority was limited to releases identified during ground water monitoring at RCRA-regulated land-based hazardous waste units, such as landfills or surface impoundments. Through HSWA, Congress substantially expanded EPA's corrective action authority, allowing the Agency to address any releases of hazardous waste or hazardous constituents to all environmental media at both RCRA permitted and nonpermitted facilities.



CORRECTIVE ACTION AUTHORITIES

One of the keys to understanding the RCRA corrective action program is knowing how a facility becomes subject to corrective action (see Figure III-35). Facilities generally are brought into the RCRA corrective action process when there is an identified release of hazardous waste or hazardous constituents, or when EPA is considering a facility's RCRA permit application.

When a facility is seeking a permit, or when a permit is already in place, EPA can incorporate corrective action into the permit requirements. Permitted facilities are required under 40 CFR Part 264, Subpart F, to monitor ground water to detect and correct any releases from regulated land-based hazardous waste land disposal units (as discussed in Section III, Chapter 5). HSWA further expanded EPA's permit authority for corrective action to address all environmental media, as well as releases from areas other than regulated land disposal units, such as tanks or containers. Permits issued to RCRA facilities must, at a minimum, contain schedules of compliance to address these releases and include provisions for financial assurance to cover the cost of implementing those cleanup measures. The HSWA statutory provisions for addressing corrective action in permits are as follows:

- Releases from **solid waste management units** (SWMUs) – Under the authority of §3004(u) of the Act, EPA requires corrective action for releases of hazardous waste or hazardous constituents from SWMUs in a facility's permit. A SWMU is any discernible unit where solid or hazardous wastes have been placed at any time, or any area where solid wastes have been routinely and systematically released.
- Releases beyond the facility boundary – §3004(v) of the Act authorizes EPA to impose corrective action requirements for releases

that have migrated beyond the facility boundary. This corrective action provision can be complementary to §3004(u), but it is not expressly limited to releases from SWMUs.

- Omnibus permitting authority – This provision, found in §3005(c)(3) of the Act, allows EPA or an authorized state to include any requirements deemed necessary in a permit, including the requirement to perform corrective action. This authority is particularly useful at permitted facilities when there is a release not associated with any particular SWMU. (Omnibus permitting authority is fully discussed in Section III, Chapter 5.)

EPA also possesses additional authorities to order corrective action that are not contingent upon a facility's permit. The statutory provisions to issue corrective action orders are:

- Releases at interim status facilities – §3008(h) of the Act authorizes EPA to require corrective action or other necessary measures through an administrative enforcement order or lawsuit, whenever there is or has been a release of hazardous waste or constituents from an interim status RCRA facility (i.e., a facility that has not yet received a RCRA permit).

**Figure III-35:
CORRECTIVE ACTION AUTHORITIES**

<u>PROVISION</u>	<u>PARTY</u>	<u>AUTHORITY</u>
Permit	Permitted TSDF	§3004(u) §3004(v) §3005(c)(3)
Order/Lawsuit	Interim Status TSDF	§3008(h)
Order/Lawsuit	Any Handler	§7003
Voluntary Decision	Any Handler	NA

- Imminent and substantial endangerment – This authority, found in §7003 of the Act, allows EPA, upon evidence of past or present handling of solid or hazardous waste, to require any action necessary when a situation may present an imminent and substantial endangerment to health or the environment (i.e., poses significant threat or harm). This authority applies to all facilities, whether or not they have a RCRA permit. EPA can waive other RCRA requirements (e.g., a permit) to expedite the cleanup process under this provision.

Corrective action need not always involve permit requirements or an enforcement order. Owners and operators of RCRA-regulated facilities may also volunteer to perform corrective action. Some activities which may be necessary to achieve corrective action goals at a facility, however, may require formal approval by EPA or the state. EPA, therefore, encourages owners and operators to work closely with EPA and state agencies to obtain sufficient oversight during voluntary cleanup activities.

CORRECTIVE ACTION COMPONENTS

The corrective action process is structured around elements common to most cleanups under other EPA programs: an initial site assessment, followed by a more extensive characterization of the contamination, and the evaluation and implementation of cleanup alternatives, both immediate and long-term. The specific components of the RCRA corrective action program are not dictated by the regulations, but are instead found in various EPA guidance and policy documents. Since the steps necessary to achieve cleanup at a facility will depend on site-specific conditions, the corrective action process is highly flexible. Therefore, the following six components of corrective action should be viewed

as considerations necessary to make good cleanup decisions, and not goals in and of themselves. These components may occur in any order, and not every component is necessary to determine that no further action is required (i.e., that the corrective action process has been completed).

■ RCRA Facility Assessment

The first component in most cleanup programs is an initial site assessment, known in the RCRA corrective action process as a **RCRA facility assessment** (RFA). During an RFA, owners and operators, with oversight by their implementing agencies, typically compile existing information on environmental conditions at a given facility, including information on areas of concern (i.e., areas that, based on past facility waste management activities, might warrant further investigation for releases), actual or potential releases, and release pathways (e.g., air, soil, or ground water through which contamination might possibly travel). This information is compiled and reviewed to eliminate areas of a facility (even entire facilities) from further consideration where there is no evidence of a release or likelihood of a release that could pose a threat to human health or the environment. This review may be followed by a visual site inspection to verify the initial information. A sampling visit is sometimes performed to obtain appropriate samples for making release determinations.

Implementing agencies often use initial site assessments, such as the RFA, to set priorities for limited oversight resources. Since it could be very expensive to oversee all corrective action sites at once, EPA sets priorities to ensure that it is

RCRA FACILITY ASSESSMENTS

RFAs compile existing information on environmental conditions at a given facility, including information on actual or potential releases.

using its resources in the most effective manner. In the corrective action program, EPA sets priorities using a resource management tool called the **National Corrective Action Prioritization System** (NCAPS). NCAPS considers the setting of a facility, actual and potential releases of hazardous constituents from the facility, and the toxicity of constituents of concern, to group facilities into high, medium, or low priority groups. In 1996, EPA estimated that 40 percent of all ranked facilities were high priority, 30 percent were medium priority, and 30 percent were low priority. Such groupings do not mean that high priority facilities will be cleaned up, while those lower in priority will be ignored or neglected. Rather, NCAPS is used to provide direction as to which facilities should be completely cleaned up first.

■ Phase I RCRA Facility Investigation

Phase I RCRA facility investigations (Phase I RFIs), sometimes referred to as release assessments, are used to confirm or reduce uncertainty about areas of concern or potential releases identified during the RFA. It is often useful to conduct a limited release assessment after the RFA, but before full-scale characterization, to focus subsequent investigations or eliminate certain units or areas from further consideration. In addition, release assessments can help determine whether interim measures are needed to contain or minimize the extent of releases while the corrective action process is taking place. Release assessments are particularly helpful in cases where the RFA is dated or where the overseeing agency and the facility owner and operator disagree about inclusion of one or more units, areas, or releases in the site characterization.

PHASE I RCRA FACILITY INVESTIGATIONS

Phase I RFIs confirm or reduce uncertainty about areas of concern or potential releases identified during the RFA.

■ RCRA Facility Investigation

If a release is identified during the RFA or the Phase I RFI, the agency overseeing the corrective action may instruct the owner and operator of the facility to conduct a full-scale site characterization to ascertain the nature and extent of contamination at the site. The site characterization, or **RCRA facility investigation** (RFI), should be tailored to the specific conditions and circumstances at the facility and should focus on the units, releases, and pathways of concern. RFIs can range widely from a small specific activity (such as investigation of soil contamination resulting from storage of waste in a specific unit) to a complex multimedia study that might include a widespread investigation of releases to air, soil, and ground water.

RCRA FACILITY INVESTIGATIONS

RFIs ascertain the nature and extent of contamination of releases identified during the RFA or Phase I RFI.

To expedite the corrective action process, EPA encourages facility owners and operators to use existing information whenever possible to avoid duplication of effort. For example, an owner and operator may have records of soil borings collected during construction of a facility. By using existing information, owners and operators can focus their investigation on collecting new data necessary to select and implement cleanup alternatives.

To facilitate investigations, EPA uses the concept of **action levels** in some cases. Action levels are risk-based concentrations of hazardous constituents in ground water, soil, or sediment. The presence of hazardous constituents above these action levels suggests that there has been a release requiring additional study or corrective measures. Under this approach, contamination at

a site found below appropriate action levels would not generally be subject to cleanup or further study.

■ Interim Measures

Interim measures are short-term actions used to control ongoing risks to human health or the environment while site characterization is underway or before a final remedy is selected. Interim measures can include a wide range of activities such as removing the source of the contamination, fencing off the contaminated area, or providing alternative drinking water sources. EPA has increasingly emphasized the importance of implementing interim measures as early as possible in the corrective action process.

INTERIM MEASURES

Interim measures are short-term actions to control ongoing risks while site characterization is underway or before a final remedy is selected.

remedy or remedy performance standards, including proposed media cleanup levels and compliance time frames. Although this recommendation is the responsibility of the owner and operator, EPA or the state agency can reject any alternative and require further analysis or prescribe a different remedy.

Upon completion of the CMS, EPA or the state agency generally summarizes the proposed remedial action plan and the findings supporting the selected remedy in a document called the **statement of basis**. This document is designed to facilitate public participation in the remedy selection process. The statement of basis describes the rationale for the remedy selection and contains an explanation for the selected cleanup levels. The scope and content for the statements of basis vary widely, depending on the complexity of the site, the nature of the proposed remedy, the level of public interest, and other relevant factors. In any case, the statement of basis should be sufficiently detailed for the public to understand and comment on EPA's or the state agency's remedy selection decision.

■ Corrective Measures Study

If the potential need for cleanup is identified during the RFI process, the owner and operator is then responsible for performing a **corrective measures study** (CMS). During the CMS, the owner and operator will identify and evaluate different alternatives to remediate the site. A CMS need not address all potential remedies; it should focus instead on realistic remedies tailored to the nature and extent of the contamination. EPA or the state agency expects facility owners and operators to develop and recommend a preferred

CORRECTIVE MEASURES STUDY

CMS identifies and evaluates different alternatives to remediate the site.

■ Corrective Measures Implementation

Once EPA or the state agency has addressed public comments, a facility can transition into the next phase of the remedial process: **corrective measures implementation** (CMI). CMI includes detailed design, construction, operation, maintenance, and monitoring of the chosen remedy, all of which are performed by the facility owner and operator with EPA or state oversight.

CORRECTIVE MEASURES IMPLEMENTATION

CMI includes detailed design, construction, operation, maintenance, and monitoring of the chosen remedy.

CORRECTIVE ACTION: A CASE STUDY

XYZ Industrial Company is a hazardous waste storage facility with a RCRA permit. During a routine EPA inspection, the Agency discovered contamination in XYZ Industrial's tank storage area. Soils under the area were contaminated by wastes spilled during pumping, and by leaking tanks. The soil exhibited high levels of trichloroethylene, a volatile organic compound that migrates easily through the soil into the ground water and is believed to cause cancer. In addition, the company discovered that a municipal drinking water well located within a mile of the facility was also contaminated with trichloroethylene. None of this contamination was detected in the initial permitting process.

EPA then conducted an RFA to compile information on the types of hazardous wastes managed at the facility in the past, areas where such wastes were managed, and possible exposure pathways.

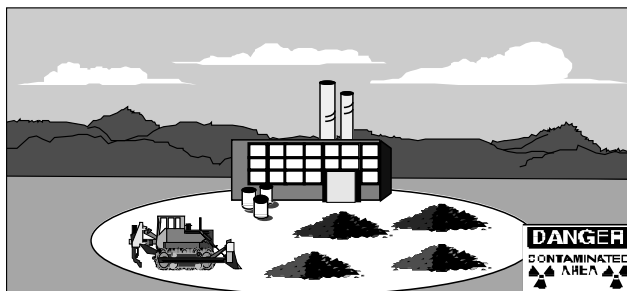
The owner and operator of XYZ Industrial then conducted an RFI, with EPA oversight, to estimate the health and environmental problems that could result if the contamination was not cleaned up, and to determine the extent of the contamination. In order to protect human health and the environment while these assessments and investigations were taking place, the owner and operator established an alternative drinking water source for the households served by the municipal well as an interim measure.

A CMS determined that the company should clean up the ground water via a pump and treat process, excavate the soil and treat it thermally, and dispose of the treated soil in a landfill on site.

In a statement of basis, EPA proposed the above technologies as the recommended remedial alternative. The statement of basis included all documentation in support of the recommended remedy, as well as the contaminant cleanup levels that had to be achieved during the remedial action. The public had an opportunity to comment on both the statement of basis and a draft permit modification that included the additional activities that XYZ Industrial would undertake as part of the remedy process. Following the public comment period, the facility owner and operator began the CMI phase of the cleanup by administering the selected remedy.

SUBPART S INITIATIVE

Presently, EPA implements the RCRA corrective action program primarily through statutory authorities and EPA guidance and policy developed pursuant to those authorities. Only a very small part of the corrective action program has been codified as regulations. In 1990, EPA proposed to incorporate a substantial part of the corrective action program in 40 CFR Part 264, Subpart S. The primary objective of Subpart S is to set forth a clear and comprehensive set of regulations and procedures that will provide a more consistent approach to investigating and making cleanup decisions. EPA has been working with states and the regulated community to develop practical, streamlined regulations to achieve cleanup goals while enhancing public participation and cost reduction. The Subpart S regulations will also serve to encourage states to assume a larger role and to seek authorization for the corrective action program.

**CONTAMINATED MEDIA**

Cleaning up RCRA facilities under the corrective action program may involve the management of large amounts of contaminated media, particularly soil and ground water. Under the contained-in policy (as discussed in Section III, Chapter 1), media that contain listed hazardous wastes or exhibit a hazardous waste characteristic generally are subject to the same management

standards as newly generated hazardous waste, including TSDF standards and LDR requirements. These strict management standards sometimes do not correspond to the level of risk posed by environmental media, which is often contaminated with relatively small amounts of hazardous waste. EPA has proposed HWIR-media (as discussed in Section III, Chapter I) to finalize provisions to facilitate the management of such remediation wastes.

REMEDIATION WASTE MANAGEMENT

While HWIR-media proposes to facilitate the management of remediation wastes, the corrective action program already contains two provisions designed to address the unique nature of remediation wastes and facilitate the selection and implementation of effective cleanup remedies.

The first provision establishes standards for **corrective action management units**. A CAMU is a physical, geographical area designated by EPA or states for managing remediation wastes during corrective action. These management provisions allow remediation waste to be managed in a unit without having to comply with LDR treatment standards, or the minimum technical requirements for land-based treatment, storage, or disposal units.

The second provision establishes standards for **temporary units** (TUs). TUs are containers or tanks that are designed to manage remediation wastes during corrective action at permitted or interim status facilities. These provisions allow EPA or states to modify the design, operating, and closure standards that normally apply to these units in order to facilitate prompt cleanup of contaminated sites.

SUMMARY

Through a process called corrective action, EPA requires RCRA-regulated facilities to investigate and clean up releases of hazardous waste or constituents to the environment.

Corrective action is included as a requirement in a facility's permit through §3004(u), §3004(v), or §3005(c)(3) statutory authorities. Corrective action can also be mandated through an enforcement order through §3008(h) or §7003 statutory authorities. Facilities may also voluntarily choose to clean up their contamination.

The corrective action process is flexible and focused on results, rather than specific steps. The six main components of the corrective action process generally are:

- The RFA, to compile existing information on environmental conditions at a given facility, including information on actual or potential releases
- The Phase I RFI (also known as a release assessment), to confirm or reduce uncertainty about areas of concern or potential releases identified during the RFA
- The RFI, to ascertain the nature and extent of contamination of releases identified during the RFA or Phase I RFI
- Interim measures to control ongoing risks while site characterization is underway or before a final remedy is selected
- The CMS, to identify and evaluate different alternatives to remediate the site
- The CMI, which includes detailed design, construction, operation, maintenance, and monitoring of the chosen remedy.

Two EPA initiatives are aimed at facilitating corrective action. The Subpart S initiative proposes to establish the regulatory authorities and guidance for corrective action as a regulatory program, in order to provide national consistency. HWIR-media proposes to finalize provisions to facilitate the management of such remediation wastes.

The corrective action program already contains two provisions designed to address remediation wastes: standards for CAMUs and TUs.